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Physico-chemical composition and consumer acceptability of date (*Phoenix dactylifera* L.) peda

BV Sonwalkar, KD Chavan and PU Wakde

Abstract
The Present investigation was conducted in the department of Animal Husbandry and Dairy Science, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar (MS), India during the year 2020-2021.The invention was carried out to optimize the levels of date (*Phoenix dactylifera* L.) syrup in *peda* and study the Physico- Chemical analysis of *peda*. On the basis of results of sensory evaluation, three levels of date syrup *viz.*, 15%, 20% and 25% were chosen. The date *peda* samples were analyzed for sensory, chemical and microbiological qualities. The mean fat, protein, total solids, reducing sugar, total sugar, vitamin A, titratable acidity (% lactic acid), pH, total fibre, ash, moisture and free fatty acids values of fresh *peda* samples were ranged from 21.58 to 23.45 per cent, 15.21 to 15.58 per cent, 83.57 to 84.08 per cent, 14.68 to 16.62 per cent, 42.59 to 43.19 per cent, 108.03 to 206.76 IU, 0.33 to 0.37% L.A., 6.28 to 6.35, 0.00 to 2.49 per cent, 2.83 to 3.22 per cent, 15.92 to 16.43 per cent and 0.09 to 0.18 per cent oleic acids, respectively. The Overall 58 per cent of the consumers reported excellent, 21 per cent reported very good, 12 and 09 per cent consumer expressed good and fair quality status of date *peda* (20% date syrup), respectively.

Keywords: Date syrup, peda, chemical quality, consumer acceptability, physico-chemical composition

Introduction
Traditional dairy products and sweets are an integral part of Indian heritage and have great social, religious, cultural, medicinal and economic importance. *Khoa* is one of the important Indian dairy products. It is used as a principal base material for the manufacture of variety of Indian sweets such as *Peda, Burfi, Gulabjamun, Kalakand, Kunda etc.* It is made of either dried or whole milk thickened by heating it in an open iron pan (Londhe and Pal, 2007) [30]. *Khoa* occupies a prominent place in traditional dairy products sector.

Khoa based sweets are also rich in minerals like calcium, phosphorous, iron, *etc*. Although milk is a poor source of iron, milk sweets like *peda* and *burfi* provide adequate amount of iron which may be entering in them during the process of preparing *khoa* in an open vessel made of iron. *Peda* is popular indigenous *khoa* based heat desiccated milk product, which is prepared from cow milk, buffalo milk or a combination thereof. It has been reported that the quantity of *pedha* produced in India exceeds any other indigenous milk based sweet using *khoa* as a raw material (Mahadevan, 1991) [32]. *Peda* has special importance in various celebrations like wedding, inaugural functions, to celebrate success in examinations or in such other events. Hindus, mostly offer *peda* to God as a '*Prasad*' which is then distributed to public.

All the types of *peda* have distinct characteristics and method of manufacture vary from region to region. The base for all these types of *peda* is, however, *khoa* and cane sugar in different proportions. Other ingredients are also incorporated to cater the special need of flavour, body and texture characteristics. Many research workers have tried to utilize different ingredients in the form of vegetables, fruits and nuts in milk products such as *gajar ka halwa, kaju burfi* and *sohan halwa*, with an aim to improve nutrient, fiber content, texture, mouthfeel and flavor. Cereals like rice and wheat in the form of maida and suji was also tried in milk products, such as *kheer, gulabjamun* (De *et al.*, 1980).

Date is very sweet, comprises about 50–88% of the total weight according to cultivar, stage of ripening and water content. Sugars make up about two thirds of date flesh with water about one fifth. Polysaccharides isolated from dates showed an antitumor activity (Ishurd and Kennedy, 2005). Date syrup contains in addition to sugar, macro and micro elements particularly high iron content (AI-Khateeb, 2008) [4]. Date syrup as a natural and nutritional additive is one of the best choice for milk flavoring and a safe alternative to added sugar to produce dairy products.

Dates or date products provide unique functionality when used with other products including sweetening, flavouring and increasing nutritional quality.

Most of the carbohydrates in this product are in the form of fructose and glucose, which are easily absorbed by the human body. The presence of natural antioxidants and phenolics in dates make them suitable against different maladies like infectious and bacterial diseases, diabetes, hyperlipidaemia, and cancer.

Incorporation of plant origin material in milk or milk products, directly or indirectly adds dietary fiber in human food. So far the research on incorporation of plant and fruit origin materials in milk and milk products has been focused on value addition to improve acceptability, taste and flavor development.

Materials and Methods

The material used and methods employed for conducting the experiments are as follows.

Materials

The khunti with flattened end with a relatively sharp edge with long handle was used for stirring cum-scrapping the milk. Fresh, clean, composite samples of buffalo milk utilized for preparation of *peda* was procured from local source. Good quality, clean, crystalline, white cane sugar was procured from local market. Good quality fresh date syrup manufactured by Lion dates Impex Pvt Ltd. Chennai was used during study.

Methods

Preparation of date *peda*

The *peda* samples were prepared as per the procedure described by Dharma Pal *et al.,* (1998) [13] with suitable modifications.

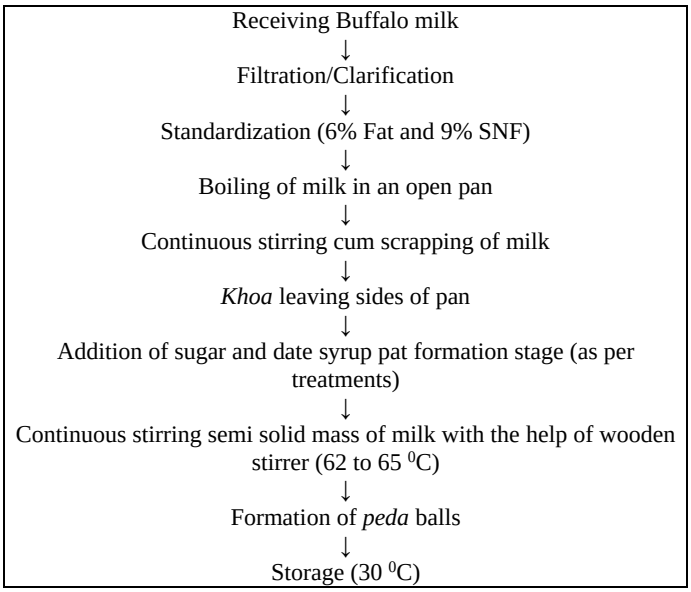

Fig 1: Flow diagram for manufacturing of *peda*

Treatment details

On the basis of the results of sensory evaluation during pre-experimental trials 15%, 20% and 25% levels of date syrup were chosen for experimental trails. The sugar level 25% of *khoa* was kept constant for all the treatments.

T_o: *Khoa* + without date syrup + 25% sugar

T_1: *Khoa* + Date syrup @15% on *khoa* weight basis + 25% sugar

T_2: *Khoa* + Date syrup @ 20% on *khoa* weight basis+ 25% sugar

T_3: *Khoa* + Date syrup @ 25% on *khoa* weight basis + 25% sugar

Physico-chemical analysis

Chemical analysis of date (*Phoenix dactylifera* L.) Syrup

Fat

The fat content of date syrup was determined by Ranganna (1986) [46].

Dry matter

The dry matter content of date syrup was determined by AOAC (1995) [3].

Protein

The protein content of date syrup was determined by the kjeldahl method (AOAC, 2000) [3].

Sucrose

The sucrose content of date syrup was determined by Ranganna (1986) [46].

Total Sugar

The total sugar content of date syrup was determined by Ranganna (1986) [46].

Ash

The ash content of date syrup was determined by AOAC (2000) [3].

pH

The pH values measurement was made using a digital pH meter.

Reducing sugar

Reducing sugar content of date syrup were measured by the Dinitrosalicylic acid method using D-glucose as a standard according to Miller (1959) [36].

Acidity

The acidity of date syrup sample was determined by AOAC (2000) [3].

Total fiber

The total fiber content of date syrup sample was determined by AOAC (2000) [3].

Mineral contents

The mineral contents of date syrup were analysed using an atomic absorption spectrophotometer.

Chemical analysis of *Khoa*

Fat

The fat content of *khoa* samples was determined by Gerber method as per the procedure described by Ladkani and Mulay (1974) [28].

Protein

The protein content of *khoa* samples was determined by Micro-kjeldahl method as described in BIS (1981) [9].

Total solids
The total solids content of *khoa* samples was determined as per the method given in IS: 1479 (Part-II) 1961.

Lactose
The lactose content of *khoa* samples was determined by the Lane-Eynon volumetric method described in BIS (1981) [9] SP: 18: Part-XI.

Moisture
The moisture content of *khoa* samples was determined according to BIS (1981) [9].

pH
The pH of *khoa* was measured using systronic digital pH meter.

Titratable Acidity (% LA)
Titratable acidity of *khoa* samples was determined as per direct method used by IS:4883 (1980).

Chemical analysis of date *peda*
Moisture
The moisture content of *peda* was determined as per procedure of Anonymous, 1959. [5]

Fat
The fat content of *peda* samples was determined by Gerber method as per procedure described by Ladkani and Mulay (1974) [28] with some modifications.

Protein
The protein content of *peda* sample was determined by semi-microkjeldhal method given by Menefee and Overman (1940) [34].

Ash
Ash content of *peda* sample was determined by method given by BIS (1981) [9].

Titratable acidity (% L.A)
The titratable acidity of *peda* samples was determined as per procedure given by Boghra and Rajorhia (1982) [45].

pH
The pH of *peda* was measured using Systronic digital pH meter, Model 335.

Total solids
Total solids content was determined by the method described in BIS (1981) [9].

Free fatty acids (FFA)
Free fatty acids (FFA) content of *peda* was estimated by the method of Thomas *et al.* (1954) [54].

Sugars
The volumetric (Lane-Eynon) method specified for ice-cream given in BIS (IS: 2802, 1964) [9] was used to determine original reducing sugars and sucrose content of *peda* samples.

Vitamin A (Carotenoid)
The total amount of carotenoids in the date *peda* samples was determined using a spectrophotometer (Thermo Scientific Evolution 60) set at 450 nm.

Total Fiber
The total fiber content of *peda* was determined as per AOAC method (1975) [1].

Statistical design and analysis of data
The experiment was laid out in completely Randomized Design (CRD) with four replications for pre-experimental and five replications for experimental trials. The data was tabulated and analyzed according to Snedecor and Cochran (1994) [53].

Results and discussion
The results of the present investigation are presented and discussed here under following headings.

Chemical Composition of milk
The chemical composition of milk (Table 1) used for preparation of *peda* had an 6.0% fat, 3.62% protein, 4.59% lactose, 0.83% ash, 15.04% total solids, 0.15% LA acidity and 6.5 pH.

Table 1: Chemical composition of milk

Constituent	Content
Fat (%)	6.0
Protein (%)	3.62
Lactose (%)	4.59
Ash (%)	0.83
Total solids (%)	15.04
Acidity (% LA)	0.15
pH	6.5

Chemical Composition of date syrup
The chemical composition of date syrup (Table 2) used for preparation of *peda* had an average 73.41% dry matter, 0.76% protein, 1.65% ash, 70.09% total sugar, 67.51% reducing sugar, 2.58% sucrose, 4.25 pH, 1.0% acidity, 5.0 g/100 ml total fiber, 0.0 g/100 ml fat, 14 mg/100 ml calcium and 2.5 mg/100 ml iron.

Table 2: Chemical composition of date syrup

Constituent	Content
Dry matter (%)	73.41
Protein (%)	0.76
Ash (%)	1.65
Total sugar (%)	70.09
Reducing sugar (%)	67.51
Sucrose (%)	2.58
pH	4.25
Acidity (%)	1.0
Total fiber (g/100 ml)	5.00
Fat (g/100 ml)	0.00
Calcium (mg/100 ml)	14
Iron (mg/100 ml)	2.5

Chemical Composition of fresh *khoa*
The chemical composition of *khoa* (Table 3) used for preparation of *peda* had an average 27.89% fat, 17.93% protein, 21.77% lactose, 72.40% total solids, 27.60% moisture, pH 6.25 and 0.30% LA acidity.

Table 3: Chemical composition of fresh *khoa*

Constituent	Content
Fat (%)	27.89
Protein (%)	17.93
Lactose (%)	21.77
Total solids (%)	72.40
Moisture (%)	27.60
pH	6.25
Acidity (% LA)	0.30

Chemical composition of fresh date *peda*

The chemical composition of fresh date *peda* samples is depicted in Table 4 and Fig.1.

Table 4: Chemical composition of fresh date *peda*

Tret.	Fat (%)	Protein (%)	Total Solids (%)	Reducing Sugar (%)	Total sugar (%)	Titratable Acidity (% LA)	pH	Total fiber (%)	Ash (%)	Moisture (%)	FFA (%)	Vit. A (IU)
T_0	23.45^a	15.21^b	84.08^a	14.68^d	42.59^b	0.33^b	6.35^a	0.00^d	2.83^b	15.92^b	0.09^d	108.03^d
T_1	22.52^b	15.45^a	83.66^b	15.17^c	42.57^b	0.35^a	6.33^b	2.01^c	3.12^a	16.34^a	0.14^c	180.55^c
T_2	21.56^c	15.52^a	83.62^b	16.22^b	43.39^a	0.36^a	6.30^c	2.29^b	3.15^a	16.38^a	0.16^b	199.04^b
T_3	21.58^c	15.58^a	83.57^b	16.62^a	43.19^a	0.37^a	6.28^d	2.49^a	3.22^a	16.43^a	0.18^a	206.76^a
SE ±	0.073	0.065	0.099	0.081	0.085	0.006	0.006	0.006	0.037	0.095	0.004	0.024
CD at 5%	0.219	0.197	0.298	0.243	0.256	0.020	0.01	0.01	0.11	0.287	0.012	0.074

The chemical composition states the richness of the product with respect to different constituents. The mean chemical composition fresh date *peda* sample is listed in Table 4 and Fig.1.

Fat

Fat is one of the important constituent in *peda*. It influences flavour, body and texture, characteristics and contributes significantly to its nutritional calorific value. The data regarding mean fat content of fresh date *peda* samples T_0, T_1, T_2 and T_3 were 23.45, 22.52, 21.56 and 21.58 per cent, respectively (Table 4 and Fig.1.). All *peda* samples significantly (P<0.05) influenced among themselves. The higher fat percentage was observed in *peda* samples prepared without or no addition of date syrup. The fat content in the *peda* samples decreased with increased level of date syrup. It is due to no fat content in the date syrup. The fat percentage was low in the *peda* prepared with 25% date syrup.

Sharma and Zariwal (1978) reported large variation in the fat content (14.92 to 23.92%) *peda*. Patel (1996) [43] observed the average values for fat content of *peda* in the range of 14.92 to 23.92 per cent. Jadhav (2004) [23] reported 17.84 per cent fat in *kandi peda*.

Protein

The protein is another important constituent which exerts direct as well as indirect influence on colour, body and texture and rheological properties of *peda.*

The mean protein content of *peda* samples prepared under various date syrup levels is presented in Table 4 and Fig.1. The mean protein content of fresh date *peda* samples T_0, T_1, T_2 and T_3 were 15.21, 15.45, 15.52 and 15.58 per cent, respectively (Table 4). The maximum protein content was observed in *peda* sample manufactured using 25% date syrup followed by 20% and 15% date syrup levels.

From Table 4, it was revealed that, the mean protein content of fresh date *peda* samples significantly (P<0.05) influenced due the addition of date syrup in the *peda* samples. The mean protein content of *peda* samples ranged from 15.21 (T_0) to 15.58 (T_3) per cent. The protein content in the *peda* samples were significant among the *peda* samples.

Ray *et al*. (2002) [47] reported the protein content of *peda* in the range of 15.26 to 16.79%.

Similar observations are reported in *peda* by Khader and Patel (1983) [23], Patel and Gandhi (1980) [46], Patel (1986) [42], Narawade (2003), Patel *et al*. (2006) [41], Garg and Mandokhot (1984) [17], Miyani (1988) [37] and Ray *et al*. (2002) [47].

Total Solids

The total solids content of fresh date *peda* samples is presented in the Table 4 and Fig.1. The mean total solids content of fresh date *peda* samples were 84.08, 83.66, 83.62 and 83.57 per cent for the treatments T_0, T_1, T_2 and T_3, respectively. It is seen that the total solids content of the *peda* samples significantly (P<0.05) influenced due to addition of levels of date syrup in the product. All the *peda* samples differed significantly among themselves. The *peda* sample prepared without date syrup (T_0) contained 84.08%, whereas the *peda* sample prepared with 25% date syrup (T_3) had 83.57% total solids. The total solids content decreased as the level of addition of date syrup increased. Decrease in total soilds content in date *peda* samples may be due to moisture content.

Dharam Pal (2000) [12] reported 81.80 to 95.80 per cent total solids in *peda.* Jadhav (2004) [23] reported 84.18 per cent of total solids content in *kandi peda*. Miyani (1988) [37] observed 80.78% total solids. Ray *et al.* (2002) [47] reported large variation in total solids content of Kolkata market *peda* samples which ranged from 68.26 to 85.88%.

Reducing Sugar

The values of reducing sugar content of date *peda* samples is presented in the Table 4 and Fig.1. It was revealed that the mean reducing sugar content of fresh date *peda* samples were 14.68, 15.17, 16.22 and 16.62 per cent, respectively for the treatments T_0, T_1, T_2 and T_3. The maximum reducing sugar content was observed in the *peda* sample prepared with 25% date syrup (16.62%). The minimum value of reducing sugar was observed in the *peda* samples prepared without addition of date syrup (14.68%).

The reducing sugar content in the date *peda* samples increased with increased level of date syrup. The reducing

sugar content in the date *peda* samples significantly (P<0.05) influenced due to addition of date syrup. All the *peda* samples were significant among themselves.

The results of present investigation are in the line with the findings of Mete *et al.* (2017) [35]. They observed the increase in the reducing sugar content of *burfi* due to increased level of khajoor in *burfi.* Bhingardive *et al.* (2012) [7] reported that increased levels of wood apple pulp resulted in gradual increase in reducing sugar content of wood apple *burfi*.

Total Sugar

The mean total sugar content of date *peda* samples is given in Table 4 and Fig.1. The mean total sugar content of fresh date *peda* samples were 42.59, 42.57, 43.39 and 43.19 per cent for the treatments T_0, T_1, T_2 and T_3, respectively. The highest value for total sugar content was observed in *peda* sample prepared with 25% date syrup (43.19%). The lowest value for total sugar content was observed in *peda* prepared without date syrup (42.59%). The total sugar content in date *peda* samples significantly (P<0.05) increased due to the addition of date syrup. The total sugar content increased as the level of addition of date syrup increased. All the *peda* samples were significant among themselves.

The results of total sugar content in the present study are at par with the findings of Mete *et al.* (2017) [35], Garg and Mandokhot (1987) [16], Bhatele (1983) [6], Kotade (2001) [27], Sakate *et al.* (2004) [48] and Kamble (2010) [25].

Titratable Acidity (% LA)

The Titratable acidity (% LA) is an important degradative chemical change, which occurs in any dairy product. The level of acidity in the product may also serve as indicator to know the extent of microbial spoilage in many food products. The high acidity content of any product adversely influences acceptability of the product.

Titratable acidity content of fresh date *peda* samples is presented in Table 4 and Fig.1. The mean titratable acidity content of date *peda* samples were 0.33, 0.35, 0.36 and 0.37% lactic acidity for the treatments T_0, T_1, T_2 and T_3, respectively. The titratable acidity of *peda* samples significantly (P<0.05) influenced due to the addition of different level of date syrup. The *peda* sample prepared with 25% date syrup had maximum titratable acidity (0.37% LA) and minimum in *peda* sample prepared without date syrup (0.33% LA).

It was observed that the acidity content in the *peda* samples significantly increased as the incorporation of date syrup level increased. All the *peda* samples were significant among themselves. The values reported for lactic acidity of date *pedha* samples in present study are almost close with the values reported by Miyani (1988) [37] and Ray *et al.* (2002) [47]. Ghodekar *et al.* (1974) and Patel and Gandhi (1980) [43] reported a considerably lower values of acidity content than the values obtained for date *pedha* samples in the present study. The results in respect of titratable acidity of present investigation are in accordance with Sakate *et al.* (2004) [48] *and* Bhingardive *et al.* (2012) [7].

pH

The pH of fresh date *peda* samples under study is presented in the Table 4 and Fig.1. The mean pH values for different date *peda* samples were 6.35, 6.33, 6.30 and 6.28 for T_0, T_1, T_2 and T_3 treatments respectively. The *peda* prepared without date syrup (T_0) had highest pH value *i.e.* 6.35. The *peda* prepared with 25% date syrup (T_1) had lowest pH value *i.e.* 6.28.

The pH of *peda* samples significantly (P<0.05) influenced due to the addition of different level of date syrup. All *peda* samples were significant among themselves. The pH and titratable acidity are the indicators of microbial activity in dairy products. It affects sensory quality of product during storage.

The pH value of a dairy product is indicative of presence of H + ion resulting from development of acidity due to lactose fermentation. This in other way suggests deterioration of the product. The pH of *peda* was inversely proportional to the acidity content. The increasing in the acidity content there was decrease in the pH values.

The values observed for pH of date *peda* samples in present study are comparable with the values reported by Garg and Mandokhot (1987) [16] and Puri and Geevarghese (2015) [44].

Total Fiber

The data in respect of total fiber content of *peda* samples is presented in Table 4 and Fig.1. The total fiber content of *peda* samples were 0.00, 2.01, 2.29 and 2.49 per cent, respectively for the treatment T_0, T_1, T_2 and T_3.

The maximum total fiber content was observed in the *peda* sample prepared with 25% date syrup (2.49%).

It was noticed that as the level of addition of date syrup in the *peda* increased the total fiber content in the *peda* also increased. It may be due to the fiber content in the date syrup. All the *peda* samples were significant among themselves.

It is seen that the total fiber content of the *peda* samples significantly (P<0.05) influenced due to addition of levels of date syrup in the product. Dixit (2017) [14] reported that fiber content in *rice bran brown peda* increased with increased level of rice bran. Sankpal (2018) [49] observed that fiber content in inulin *peda* increased with increase in addition of inulin fiber.

Ash

The values of ash content of the date *peda* samples is highlighted in Table 4 and Fig.1. The ash content of fresh date *peda* samples significantly influenced due to the addition of date syrup. The mean ash content of the *peda* samples were 2.83, 3.12, 3.15 and 3.22 per cent for T_0, T_1, T_2 and T_3, respectively.

The *peda* sample prepared with 25% date syrup had maximum ash content (3.22%) and minimum in *peda* sample prepared without date syrup (2.83%). The moisture content increased as the level of date syrup increased in the *peda*.

The ash content was increased as the level of date syrup increased. All the *peda* samples were significant among themselves.

The results of ash content in the present investigation are comparable with research findings of Shinde *et al*. (2015) and Dharam Pal (2000) [12]. They reported the values of ash content 2.57% and 1.40 to 3.40%. Miyani (1988) [37] observed the ash content values in the range of 2.91 to 3.24 per cent of market, cow and buffalo milk *peda* samples. Narwade *et al.* (2007) [39] observed 3.52 per cent ash content in *peda*. Rajorhia and Sen (1987) [45] observed that the ash content in *peda* ranged from 1.4 to 3.4 per cent.

Moisture

Moisture is an important parameter of the *peda.* The moisture present in the product not only affects the sensory, but also affects rheological characteristics, biochemical and microbiological activities which directly influences the shelf

life of the product. The values pertaining to the moisture content of date *peda* samples as influenced by addition of different levels of date syrup is presented in Table 4 and Fig.1. The moisture content of fresh date *peda* samples significantly (P<0.05) influenced due the addition of date syrup in the *peda.* The mean moisture content of *peda* samples ranged from 15.92 (T_0) to 16.43 (T_3) per cent. All the *peda* samples were significant among themselves.

The mean moisture content of *peda* samples were 15.92, 16.34, 16.38 and 16.43 per cent for T_0, T_1, T_2 and T_3, respectively.

The *peda* sample prepared with 25% date syrup had maximum moisture content (16.43%) and minimum in *peda* sample prepared without date syrup (15.92%). The moisture content increased as the level of date syrup increased in the *peda*. The values of moisture content of date *peda* samples in the present study are at par with the moisture content reported by Narwade (2003) [38]. Ghule *et al.* (2013) [18] reported that increase in the level of incorporation of bottle gourd pulp in the *peda* increased the moisture content up to 18.32-23.04 per cent.

Matkar (2006) [33], Sirsat (2012) [52] and Lingayat (2014) [29] reported that addition of fig in *burfi*, ash gourd in *peda* and wheat bran in *peda* increased moisture content from 13.67 to 18.49, 14.00 to 22.58 and 13.50 to 14.60 per cent, respectively.

Free fatty acids (% oleic acids)

The data in Table 4 and Fig.1. shows that the mean values of free fatty acids content in the date *peda* samples. The free fatty acids content of fresh date *peda* samples significantly (P<0.05) influenced due the addition of date syrup in the *peda*. The mean free fatty acids content of *peda* samples ranged from 0.09 (T_0) to 0.18 (T_3) per cent oleic acids. All the *peda* samples were significant among themselves.

The mean free fatty acids content of *peda* samples were 0.09, 0.14, 0.16 and 0.18 per cent oleic acids for T_0, T_1, T_2 and T_3, respectively.

The *peda* sample prepared with 25% date syrup had maximum free fatty acids content (0.18% oleic acids) and minimum in *peda* sample prepared without date syrup (0.09% oleic acids). Jha *et al.* (1977) [24], Biradar (1981) [8], Khader and Patel (1983) [26] and Londhe *et al.* (2012) [31] reported similar trend of observations.

Vitamin A

The data in Table 4 and Fig.1. shows that the mean values of vitamin A in the date *peda* samples. The vitamin A content of fresh date *peda* samples significantly (P<0.05) influenced due the addition of date syrup in the *peda*. The mean vitamin A content of *peda* samples ranged from 108.03 (IU) (T_0) to 206.76 (IU) (T_3). All the *peda* samples were significant among themselves.

The mean vitamin A content of *peda* samples were 108.03, 180.55, 199.04 and 206.76 (IU) for T_0, T_1, T_2 and T_3, respectively. The sample T_3 (206.76 IU) had significantly higher content over the rest of treatments. The sample T_0 (108.03 IU) had significantly lower vitamin A content. The vitamin A content was increased due the addition of date syrup in the *peda*. It may be due to vitamin A content of date syrup. More (2019) reported that vitamin A content in *burfi* increases with increase in addition of red pumpkin (*Cucurbita pepo* L).

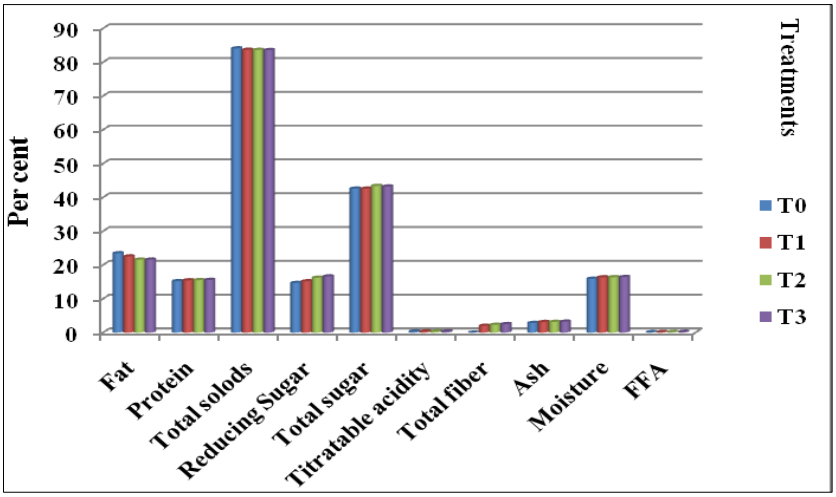

Fig 1: Chemical composition of fresh date *peda*

Consumer Acceptability

The date *peda* samples prepared from 20% date syrup (T_2) was tasted to 100 consumers (male and females of different age group) randomly and is given in Table 5 and Fig. 2. In order to elucidate the acceptability of the finished product it was necessary to expose it to the fairly large number of consumers and seek their opinion about the product. A fresh date *peda* was prepared for consumer acceptability. The product was provided to the consumers for taste and to know their response. A questionnaire was provided to the consumers along with the date *peda*.

The frequency distribution of the consumer perception of date *peda* is given in Table 5 and Fig.2.

Table 5: Overall frequency distribution of consumer's acceptability of the date *peda*

Acceptability	Male	Per cent	Female	Per cent	Total	Per cent
Excellent	27	27	31	31	58	58
Very good	09	09	12	12	21	21
Good	05	05	07	07	12	12
Fair	06	06	03	03	09	09
Total	47	47	53	53	100	100

The data depicted in Table 5 and Fig.2, shows the frequency distribution of consumer's acceptability of the date *peda.* On the basis of sex group, out of 100 consumers the product was offered to 47 males (47%) and 53 females (53%). Among the

male consumers, 27 (27%) rated as excellent, whereas the 09 (09%) and 05 (05%) rated the product as very good and good, respectively. Only 6 (6%) male consumers rated the product as fair.

Among the female consumers, 31 (31%) rated as excellent, whereas the 12 (12%) and 07 (7%) rated the product as very good and good, respectively. Only 03 (03%) female consumers rated the product as fair. Overall, 58 per cent of the consumers reported excellent quality, 21 per cent reported very good, 12 and 9 per cent consumer expressed good and fair status of date *peda*, respectively.

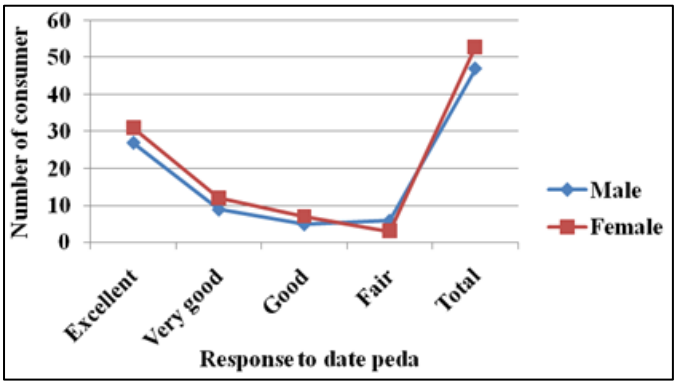

Fig 2: Overall frequency distribution of consumer's acceptability to date *peda*

Conclusions

The results of this investigation would lead to conclusions as under: The fresh date *peda* (20% date *syrup*) had the chemical composition as 21.56 per cent fat, 15.52 per cent protein, 83.62 per cent total solids, 16.22 per cent reducing sugar, 43.39 per cent total sugar, 0.36 per cent lactic acidity, 6.30 pH, 2.29 per cent total fibre, 3.15 per cent ash and 16.38 per cent moisture, 0.16 per cent free fatty acids and 199.04 (IU) vitamin A, respectively. Out of 100 consumers, overall 58 per cent consumers reported excellent, 21 per cent reported as very good, 12 per cent reported good and 9 per cent reported as fair about the quality of *peda* manufactured using 20 per cent date syrup.

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